CHLAMYDIA PNEUMONIAE INFECTION AND CARDIAC RISK FACTORS IN PATIENTS WITH MYOCARDIAL INFECTION

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Abstract

BACKGROUND: Evidences support the possible involvement of microorganisms such as Chlamydia pneumonia in the pathogenesis of ischemic heart diseases through a chronic inflammatory process. The aim of this study was to determine the relation between Chlamydia pneumoniae seropositivity with acute myocardial infarction and its related risk factors.

METHODS: In this case-control study, 88 patients admitted in CCU with a diagnosis of acute coronary syndrome, without a history of chronic diseases including cancers were selected as cases and 49 surgical patients without an evidence of cardiovascular disease according to clinical examinations and ECG were selected as controls. Demographic characteristics and background risk factors were obtained using a questionnaire by expert nurses. Venous blood sample was obtained from participants for measuring the anti Chlamydia IgG and IgM antibodies using ELISA method. The prevalence of antibodies was compared in both groups and its relation with coronary syndrome was evaluated.

RESULTS: 88 and 49 patients were enrolled in case and control groups, respectively. Mean age of patients and the controls was 14 ± 59.7 and 13 ± 56.9 years, respectively (P = 0.26). Anti Chlamydia IgG seropositivity rate was 63(71.9%) and 23(46.9%) in case and controlcontrol groups, respectively (P < 0.01; OR: 2.85; CI 95%: 1.38 - 5.9). Anti Chlamydia IgM was positive in 1 patient and 1 control. Anti Chlamydia IgG seropositivity rate was higher in patients older than 50 years old than those younger than 50 years old (OR: 2.83; CI 95%: 1.31 -1.14). There was a significant relation between BMI, smoking and Anti Chlamydia IgG seropositivity.

CONCLUSION: Considering the relation between anti Chlamydia antibody IgG seropositivity with BMI and myocardial infarction, it seems that appropriate diagnosis and treatment of these prone patients can be benefical.

Introduction

Atherosclerosis considered as the most important causes of mortality and morbidity worldwide. Various factors have been introduced in the pathology of atherosclerosis and acute myocardial infarction such as: defect in lipid metabolism, change in the concentration of various lipoproteins of cholesterol, genetic factors, diabetes, age, sex, and smoking habit. These factors are known to be involved directly or indirectly in atherosclerotic changes of arteries.[1]

Today, in addition to previously identified traditional risk factors, other factors are reported to play a role in atherosclerosis.[2]

Of these factors microorganisms such as Chlamydia pneumoniae, Cytomegalovirus, Helicobacter pylori, Streptococcus sanguis and Herpes type 1 and 2 can be noted. Microorganisms can invade the endothelium directly or indirectly and for example can cause endothelial damage by releasing endotoxins and lipopolysaccharides into the blood. On the other hand systemic responses to infections such as cytokine release can cause changes in lipid profile and make the endothelium prone to thrombosis and lead to formation of atherosclerotic plaque or thrombus.[3,4]

Of these infections, infections such as Chlamydia

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pneumoniae which there is an effective antibiotic treatment for them are very important. Infections caused by Chlamydia pneumonia are considered to participate in inflammatory processes leading to coronary artery disease. After primary infection; the bacteria remain dormant intracellulary causing a chronic inflammatory stimulus.[5] Recent seroepidemiologic findings in patients defected by coronary artery diseases have shown a relation between Chlamydia pneumoniae and atherosclerosis.[6]

In some studies a significant positive association was found between being overweight and IgG antibodies for Chlamydia pneumoniae.[7]

For the first time in thereigon, this study aimed to investigate the role of Chlamydia pneumoniae seropositivity with acute myocardial infarction and its related risk factors.

Materials and Methods

In this case - control study, 88 patients admitted in CCU with a diagnosis of acute coronary syndrome without a history of chronic diseases including cancers were selected as case group and 49 surgical patients (ENT patients, gynecology, hernia) without an evidence of cardiovascular disease according to clinical examinations and ECG were selected as control group.

Demographic characteristics and background risk factors were obtained using a questionnaire by expert nurses. Venous blood sample (5 cc) was obtained from all participants of two studied groups for measuring the anti Chlamydia IgG and IgM antibodies using ELISA method by MEDEC KIT.

Anti Chlamydia pneumoniae seropositivity rate was compared in case and control groups and its relation with coronary syndrome was evaluated.

Obtained data from case and control groups was analyzed by SPSS software and forward conditional logistic regression and chi-square statistical tests.

Results

In this study 88 and 49 patients were enrolled in case and control groups, respectively. Mean age of patients in case and control groups was 14 ± 59.7 and 13 ± 56.9 years, respectively (P = 0.26). Other demographic characteristics and risk factors are presented in Table 1.

Anti Chlamydia IgG seropositivity rate was 63(71.9%) and 23(46.9%) in case and control groups, respectively (P < 0.01; OR: 2.85; CI 95%: 1.38-5.9). In both groups, only one was positive for anti-Chlamydia IgM antibody. The anti Chlamydia IgG seropositivity rate was higher in patients older than 50 years old than those younger than 50 years old (OR: 2.83; CI 95%: 1.31-1.14).

The relation between anti Chlamydia IgG seropositivity and myocardial infarction and its related risk factors is presented in Table 2.

Table 1. Demographic charactristics and risk factors in case and control groups

Variable		Case Number (%)	Control Number (%)	P value
Sex	Female	21 (23.9)	26 (53.1)	0.001
	Male	67 (76.1)	23 (46.9)	
Age(y)	≤ 50	27 (30.7)	16 (32.7)	0.82
	> 50	61 (63.9)	33 (67.3)	
BMI(kg/m²)	< 20	15 (17.1)	5 (10.2)	0.14
	20 - 25	42 (47.7)	32 (65.3)	
	> 25	31 (35.2)	12 (24.5)	
Hypertention	No	65 (73.9)	44 (89.8)	0.03
	Yes	23 (26.1)	5 (10.2)	
Diabetes	No	78 (88.6)	47 (95.9)	0.15
	Yes	10 (11.4)	2 (4.1)	
Hyperlipidemi	No	64 (72.7)	48 (98)	<0.001
	Yes	24 (27.3)	1 (2)	
Smoking	No	60 (68.2)	49 (100)	<0.001
	Yes	28 (31.8)	0 (0)	
History of cold	No	67 (76.1)	47 (95.9)	0.003
	Yes	21 (23.9)	2 (4.1)	

Table 2. The relation between positive anti chlamydia IgG and myocardial infarction and its related risk factors

Risk factors		Number (%)	Chlamydia pneumoniae	OR (CI 95%)	P value
Myocardial infarction	No	49 (35.8)	23 (46.9)	1	0.005
	Yes	88 (64.2)	63 (71.6)	2.85 (1.38 - 5.9)	
Age	≤ 50	43 (31.4)	20 (46.5)	1	0.01
	> 50	94 (68.6)	66 (70.2)	2.83 (1.31 - 1.14)	
BMI	< 20	20 (14.6)	9 (45)	1	
	20 - 25	74 (54)	47 (63.5)	3.57 (1.18 - 10.81)	0.03
	> 25	43 (31.4)	30 (69.8)	3.88 (1.2 - 12.56)	
Smoking	No	109 (79.6)	63 (57.8)	1	0.04
	Yes	28 (20.4)	23 (82.1)	3.68 (1.08- 12.53)	

Discussion

In this study, we investigated the relation between both anti Chlamydia IgM and IgG seropositivity with myocardial infarction and its related risk factors. 71.6% and 1.1% of patients with acute coronary syndrome had positive anti chlamydia IgG and IgM antibodies, respectively. The anti Chlamydia IgG seropositivity rate was significantly higher in case group than control one and we concluded that there is a relation between anti Chlamydia IgG antibody and acute myocardial infarction.

Chlamydia pneumoniae is responsible for most of Chlamydia infections in human and 90% of Chlamydia pneumoniae infections are mild or asymptomatic. Total anti Chlamydia seropositivity rateis estimated to be 30% in middle-aged adults, worldwide.

Reports of prevalence of antibodies against this infection are relatively based on methods used for diagnosis such as microimmunofluorescence, compliment fixation, and enzyme immunoassay. Determination of the cut-off point and cross reaction with other species is also effective. IgM antibody is used for diagnosis of acute infection. IgG class antibody titer is lasts for a long duration and reduces slowly and indicates history of infection with an unknown duration. High titers of IgG are of diagnostic value for chronic infection.[8]

In recent years some studies have investigated possible role of Chlamydia pneumoniae in coronary artery diseases and controversial results has been reported. One of the important reasons is lacking a microimmunofluorescence standard and variability of acceptable cut-off titers of the test. Problems in description of Chlamydia serologic tests and variability of methods of antibody detection has led to different cut-off points in various studies, different methods of measurement and unique timing of sampling.[9]

Several studies have supported the role of Chlamydia pneumoniae in the initiation and continuationof atherosclerosis.[9-14]

Constant infection of Chlamydia pneumoniae in lungs and in atherosclerotic plaques is reported in some studies.[15] Some studies did not support the mentioned relation between Chlamydia pneumoniae and atherosclerosis but majority of studies have reported that Chlamydia infection is involved in atherogenesis.[9,10,16,17]

Epidemiologic studies reveal the propagation of Chlamydia infection around the world and majority of people are infected before age 20.[18]

In a study conducted on relation between Chlamydia pneumoniae and metabolic syndrome in Taiwan in 2009, there was a positive association between older age, smoking and Chlamydia specific antibody that was consistent with our study.[19]

In our study 70% of subjects younger than 50 and 77% of older than 55 years old subjects with acute myocardial infarction had been infected with Chlamydia pneumoniae. Also higher rate of anti Chlamydia IgG seropositivity in male patients in comparison with females in this study could explain the higher incidence of atherosclerotic diseases in male patients.

The relation between Chlamydia seropositivity and hyperlipidemia, diabetes and hypertension was reported in some previous studies[19], but there was no significant relationship between mentioned factors and anti Chlamydia seropositivity in current study.

Our study showed a significant relationship between obesity and Chlamydia pneumonia which was consistent with some studies in this field.[7,20] Presence of atherosclerosis in patients without any typical risk factors and with positive Chlamydia pneumoniae infection can be related to these effects: direct effects of Chlamydia pneumoniae on endothelium and their growth in endothelial cells and direct effects of the microorganism in preparation of macrophages for absorption of oxidize LDL which is the first step of atherogenesis initiation. So, the

presence of Chlamydia pneumoniae along with oxidative factors and oxidation can be possibly more important than hypercholesrolemia in the pathogenesis of atherosclerosis.[5]

Conclusion

In this study there was a significant relation between Chlamydia pneumonia seropositivity and acute myocardial infarction .Also, our study showed a significant relationship between obesity, older age, smoking and Chlamydia pneumoniae seropositivity.

For more conclusive findings in this field further investigation with larger sample size is recommended.Also considering the simplicity of treatment, we suggest that all angina pectoris patients, obese persons, old patients, and smokers that are at risk for acute ischemic accident should be evaluated and treated for this infection.

Acknowledgments

Conflict of Interests

Authors have no conflict of interests.

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